Item: 15

General Meeting of the Council: 10 December 2024.

Notice of Motion.

Report by Corporate Director for Neighbourhood Services and Infrastructure.

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1. Overview

1.1. This report considers the implications of the suggested course of action contained in the Notice of Motion lodged by Councillor Gillian Skuse, as detailed on the agenda for this meeting.

1.2. The Notice of Motion requests that options for dealing with wave overtopping at Churchill Barrier No.2 are re-evaluated, that up to date cost estimates are developed and that a preferred option is recommended. This matter was last discussed by the Council in February 2021 and was the culmination of many years of investigative work.

1.3. This report summarises the key pieces of work done to date with regards to addressing the problem of wave overtopping and provides some further background information relating to the process and frequency around closing the Barriers during adverse weather conditions.

1.4. It also sets out the proposed set of actions, should the Notice of Motion be agreed, together with the financial requirements.

2. Recommendations

2.1. It is recommended that members of the Council:

i. Consider whether to support the Notice of Motion.

ii. Authorise the Corporate Director for Neighbourhood Services and Infrastructure to implement the actions detailed in section 7 of this report, funded through a contribution from the Capital Project Appraisal Fund, should the Notice of Motion be supported.

3. Notice of Motion

3.1. The Notice of Motion, detailed on the agenda for this meeting, lodged on 11 November 2024 in accordance with Standing Order 17.1, requests that further work is carried out to assess the costs and implications of developing a physical solution to the issue of wave overtopping at Churchill Barrier No. 2. The full text of the Notice of Motion is provided below:

"In March 2021, following consideration of a report presented to the Development and Infrastructure Committee on 2 February 2021, the Council resolved that no further studies be undertaken at that time in respect of wave overtopping at Barrier No. 2, and the Executive Director of Development and Infrastructure should explore financial support from the Scottish Government for potential engineering solutions. In recent years, weather conditions and safety measures have seen an increase in the number of occasions that the barriers have been closed and, if climate change projections are accurate, this could increase further in years to come. It is therefore proposed that the costs of the options to deal with wave overtopping at Barrier Number 2, as identified in the aforementioned committee report, should be updated and presented to the Council, to include a recommended preferred option and an estimate of the associated cost, and that the relevant Corporate Director update the Council on the work that has been undertaken to date around exploring financial support for potential engineering solutions, to allow any further action to address the wave overtopping at Barrier Number 2 to be considered and determined by the Council.".

3.2. Standing Order 17.2 provides that a Notice of Motion must be received by the Chief Executive at least 14 Clear Days prior to the date of any Meeting of the Council, in order for the Notice of Motion to be included within the business of that Meeting.

3.3. Standing Order 17.3 states that a Notice of Motion shall be accompanied by a report by the Chief Executive or the relevant Corporate Director on the implications of any suggested course of action.

4. Background

4.1. On 2 February 2021, when considering the outcome of consultation on five options for wave overtopping at Churchill Barrier No 2, the Development and Infrastructure Committee recommended:

i. That no further studies be undertaken at this time in respect of wave overtopping at Barrier Number 2.

ii. That the Executive Director of Development and Infrastructure should explore financial support from the Scottish Government for potential engineering solutions, failing which the Council should determine what action to take.

iii. That the Executive Director of Development and Infrastructure should undertake to continue to review options to enhance current safety arrangements with regard to wave overtopping at Barrier Number 2 where possible.

4.2. As a consequence, no further investigation of options to address the wave overtopping has taken place. However, a number of refreshed protocols and risk assessments have been put in place with regards to the process of closing the barriers during adverse weather events, with the focus firmly on providing a robust and objective approach, combined with clear communication to the community impacted by these closures. Stringent efforts have been made to ensure that residents have access to up-to-date information regarding any closures and the ongoing review process when this happens.

4.3. The Council engaged with the Scottish Government via the Strategic Transport Projects Review 2 (STPR2) process, making the case for centralised funding for a number of projects, including the management and maintenance of the Churchill Barriers. However, as the STPR2 process included only those assets under the direct control of Transport Scotland, all projects in Orkney were sifted out.

4.4. Subsequently, the Council provided submissions to the Islands Connectivity Plan consultation, highlighting the age and condition of the barriers, together with the impact on residents and businesses of weather related closures. As a result, the Council made strong representation that management of fixed links such as the barriers should be given due weight and consideration within the plan. This consultation process has now closed and Transport Scotland intend to produce the final plan towards the end of 2024.

5. Barrier Closure process

5.1. In certain wind and tide conditions there is potential for waves overtopping the first, second and third Churchill Barriers, causing a hazard for road users. Generally, although not always, conditions are most severe on the second Barrier, due to its relatively more exposed nature.

5.2. Given the seriousness of the hazard, it is necessary to consider, and if needed, enact road closures for the duration of these events. These road closures are carried out jointly between Police Scotland and Orkney Islands Council.

5.3. In general, closures occur for only a few hours in duration, largely around the time of high tide. However, in particularly severe weather conditions closures can last for longer.

5.4. Data regarding the number and total duration of closures from 1 January 2021 to 10 February 2024 are shown in the following table. There have been no closures since February 2024, as of the date of writing this report.

	2021	2022	2023	2024
Number of closures	6	10	16	6
Total duration of closure (hours)	23.15	44.8	53.95	24.7

5.5. It should be noted that a single weather event may result in more than one closure, if the duration lasts longer than a single tidal cycle, meaning that the road is opened for a while before having to be closed again as the tide rises and over-topping becomes an issue once more.

6. Options identified to deal with wave overtopping

6.1. To prevent the need to close the Barriers, discussions have taken place over many years regarding physical interventions which could be made to dissipate the power of the waves and stop them from coming over the road surface. These discussions have focused on solutions for overtopping at Barrier No.2, as this is the one most often at risk. Certain weather conditions can also cause issues at Barriers No.1 and No.3. but due to the relatively less frequent incidence of this, options have only been developed for Barrier No.2.

6.2. In 2014 work was carried out to progress technically viable solutions to address the wave overtopping and to develop them to a conceptual level. The impact of each option was modelled so as to provide design parameters which would reduce overtopping to below 1 litre per second per metre (l/s/m) during a 1 in 1 year storm and below 10 l/s/m during a 1 in 200 year storm. These design limits are in accordance with industry standard guidance regarding overtopping limits below which it is safe to drive at a low speed. Currently, closure of the barrier is likely when overtopping exceeds 1 l/s/m.

6.3. Data collection to help calibrate and validate the model was carried out in the last quarter of 2013.

6.4. The four options which were modelled had previously been identified in a separate study and subsequently refined as part of this work. In summary they were:

- Reface the existing barrier (different material options, different crest heights).
- Breakwater (nearshore or offshore).
- Construction of a bridge (partial span).
- Beach recharge.

6.5. The first two options considered the construction only on the eastern side of the barrier, meaning that any events caused by a westerly wind would still lead to barrier closure. Historically, around one third of closures have related to winds from the west.

6.6. The construction of a bridge was included due to its potential for facilitating the deployment of a range of tidal energy devices. Therefore, this option is designed so as to be able to incorporate these devices. However, market investigations have indicated that there is no external interest in this type of project.

6.7. Each option was modelled, with the dimensions required to meet the design standards then being used to determine the likely cost.

6.8. The costs for each option represent best estimates at the time and so are 10 years out of date. They also represent only the estimated actual cost of construction and do not take into account the full project costs, including ground investigations, impact assessments, licensing and other project fees.

6.9. The costs reported to the Development and Infrastructure Committee in June 2014 for the various options are detailed in the table below.

Option	**Estimated Cost (£m)**
1 - Reface Barrier (rock armour)	16.5 – 18.0
1 - Reface Barrier (concrete block)	23.0 – 25.0
1 - Reface Barrier (Xbloc)	17.0 – 18.0
2.1 - Nearshore breakwater (rock armour)	30.0
2.1 - Nearshore breakwater (concrete block)	47.0
2.1 - Nearshore breakwater (Xbloc)	22.0
2.2 - Offshore breakwater (concrete block)	81.0
2.2 - Offshore breakwater (Xbloc)	60.0

Option	Estimated Cost (£m)
3 - Bridge	23.0
4 - Beach Recharge	17.0

6.10. Retail price inflation (RPI) since June 2014 has been 52.4% with construction inflation generally running ahead of RPI. The independent cost information service BCIS provide building cost indices, with their concrete index showing a 57.7% increase between June 2014 and October 2024. A 60% uplift on the 2014 cost estimates above would therefore provide a rough estimate of the 2024 cost of the various options. This is further shown in the table below.

Option	Estimated inflated Cost (£m)
1 - Reface Barrier (rock armour)	26.4 – 28.8
1 - Reface Barrier (concrete block)	36.8 – 40.0
1 - Reface Barrier (Xbloc)	27.2 – 28.8
2.1 - Nearshore breakwater (rock armour)	48.0
2.1 - Nearshore breakwater (concrete block)	75.2
2.1 - Nearshore breakwater (Xbloc)	35.2
2.2 - Offshore breakwater (concrete block)	129.6
2.2 - Offshore breakwater (Xbloc)	96.0
3 - Bridge	36.8
4 - Beach Recharge	27.2

6.11. As noted above, these costs do not allow for project development and relate to the cost of construction only. Therefore, a further amount should be added to reflect the actual full cost of the project.

7. Suggested action

7.1. Following notification of the Notice of Motion, officers have contacted the consultants who carried out the original work in 2014 to discuss the steps necessary to update the costs, noting that due to the time that has passed it would be prudent to also ensure that the options continue to represent best available technology and are in accordance with any updated or refreshed guidance regarding management of flood waters.

7.2. As a result, a series of actions have been identified, as follows:

i. Review of previous 2014 options costs to revise to a 2024 construction cost base.
ii. Review of options to remove elements within any option that were related purely to tidal energy capture, on the basis that this is not being pursued at this time.
iii. Update option proposals and costs to reflect changes in industry guidance, modelling methods and climate change data and predictions.
iv. Further analysis and assessment to determine how climate change factors may affect the number of closures expected in future years.

7.3. On the basis that no solution is likely to be able to entirely prevent the need for closure under all circumstances it would also be prudent to investigate options with lower design thresholds to establish what this would mean in terms of measurable impacts (i.e. likely necessary closures) and put this into context with regards to other comparable structure or routes elsewhere.

7.4. For each option the full cost of the final scheme will be provided, including an estimate of up front scheme development costs such as design development, consents (Environmental Impact Assessment and planning), marine licences and further studies including ground investigation and wave studies. Based on the costs associated with other large-scale capital projects, these are likely to be significant.

7.5. The outcome of this process would be a Stage 1 Capital Project Appraisal, identifying the preferred option, and the costs required to fully develop this to the point of a Stage 2 Capital Project Appraisal. The Stage 1 Capital Project Appraisal would then be submitted to the Development and Infrastructure Committee in due course, to enable a decision regarding whether to progress with any identified preferred option.

8. Financial implications

8.1. Discussions are ongoing to determine the costs associated with each of the stages described above. Whilst the first two steps are relatively straightforward, full implementation of step 3 is likely to be a considerable piece of work with costs to match. In addition, if the work described in paragraph 7.3 is also carried out this would add another substantial element to the proposal.

8.2. Whilst we await detailed estimates from the consultant regarding this work, it would be prudent to budget around £50,000 for the work identified in paragraph 7.2 with a further £30,000 - £50,000 required for the work in paragraph 7.3.

8.3. There is no available funding within existing service budgets therefore this would need to come from an alternative source such as the Capital Project Appraisal Budget. Whilst there is sufficient money within this Fund, it should be noted that this project has already received £92,000 from this Fund and that further expenditure reduces the amount available to progress other Council projects.

8.4. The available headroom in the Council's capital programme is estimated at £24 million over the next five years so there is very limited ability for the Council to undertake significant capital works without securing significant additional funding.

8.5. It should be noted that even if this work is carried out the recommended option may continue to be to do nothing, on the basis of the significant capital costs associated with all of the options, the lack of funding to carry these out and the relatively low level of beneficial impact for this level of spend.

For Further Information please contact:
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Implications of Report

1. **Financial.** The sum of £325,000 was set aside in financial year 2012/13 to allow a Barriers feasibility study to be progressed. That funding was fully expended on feasibility study works.
   A further £91,658 has been spent in previous financial years, with funding from the Capital Project Appraisal Fund. Additional funding of between £80,000 and £100,000 has been estimated for the work required to cover the costs of employing a consultant to carry out the work noted at paragraphs 7.2 and 7.3. This funding could be made available through a further allocation from the Capital Project Appraisal Fund but reduces the development funding available for other proposed capital projects that may come forward.
2. **Legal.** None arising directly from the recommendations in this report.
3. **Corporate Governance.** This report is prepared in accordance with the relevant Standing Orders.
4. **Human Resources.** The necessary work will be carried out by external contractors. However, it will require to be managed from within the Engineering Services team meaning that it will need to be accommodated within existing workloads.

5. **Equalities.** N/A
6. **Island Communities Impact.** The intent behind this work is to provide added resilience for transport links between Burray and South Ronaldsay and Mainland Orkney.
7. **Links to Council Plan.** The proposals in this report support and contribute to improved outcomes for communities as outlined in the following Council Plan strategic priorities:
   ☒Growing our economy.
   ☒Strengthening our Communities.
   ☒Developing our Infrastructure.
   ☐Transforming our Council.
8. **Links to Local Outcomes Improvement Plan.** The proposals in this report support and contribute to improved outcomes for communities as outlined in the following Local Outcomes Improvement Plan priorities:
   ☐Cost of Living.
   ☒Sustainable Development.
   ☒Local Equality.
9. **Environmental and Climate Risk.** The increasing incidence of wave overtopping on Barrier No. 2 is a direct consequence of climate change which is driving increased sea levels and more frequent extreme weather events.
10. **Risk.** The risk at this stage is minimal as the work relates only to costing a range of options. Any risk would come later in the project and be associated with the development of a capital project. By ensuring that the full costs of each option are detailed within the Stage 1 Capital Project Appraisal, construction risks should be minimised.
11. **Procurement**. The procurement of the consultant to carry out the work will be done in accordance with Contract Standing Orders.
12. **Health and Safety.** None directly related to this project at the moment.
13. **Property and Assets.** At this stage, no direct impact although any subsequent project to create a physical impediment to the overtopping would add an asset.
14. **Information Technology.** N/A
15. **Cost of Living.** N/A

List of Background Papers

Development and Infrastructure Committee: 2 December 2014, Item 25 - Churchill Barriers – Barrier No2 – Wave Overtopping and Tidal Flow Energy Capture – High Level Hydraulic Modelling Study Interim Report.

Development and Infrastructure Committee: 2 April 2019, Item 13 - Churchill Barriers - Wave Overtopping and Tidal Energy Capture.

Development and Infrastructure Committee: 10 September 2019, Item 14 - Churchill Barriers - Wave Overtopping.

Development and Infrastructure Committee; 2 February 2021, Item 8 – Churchill Barriers – Wave Overtopping.